POLICY AND ANALYSIS
SERVICE

PRAIRIE PROVINCES

WATER SUPPLY CONDITIONS REPORT

TO JULY 13, 1987

JULY 15, 1987

PRAIRIE FARM REHABILITATION ADMINISTRATION SERVING THE PRAIRIE PROVINCES

Canada

SUMMARY

In general terms, hot dry weather persisted across the Prairie region during the 1987 growing season until early July. Cooler temperatures and more general shower activity since the beginning of July has improved crop growth prospects in many locations. However, in much of southern Alberta, western Saskatchewan and southern Manitoba precipitation was below 60 percent of normal. Generally, between 25 and 50 mm of rainfall in south central Manitoba between July 7-13 has greatly improved soil moisture reserves in that region.

Most of the rainfall received to date has been from localized convective activity. The amount of rainfall that has fallen at weather stations may be significantly more or less than the shower activity in surrounding fields. This makes it very difficult to make accurate projections of soil moisture conditions.

By early June the water supply outlook in southern Alberta had deteriorated significantly and it was apparent that there was a high probability of water supply deficiencies during the summer. Natural water supply volume forecasts for the remainder of the growing season are below normal on southern streams and near normal on the North Saskatchewan River basin. Irrigation storages on major systems are generally good; however, shortages may be expected at Lethbridge Northern. Transalta Utilities indicates that hydroelectric production will be below normal at Big Horn on the North Saskatchewan River and on the Bow River system this year.

Normal irrigation deliveries are expected for most projects in the Saskatchewan Southwest Irrigation. Water supplies have generally deteriorated throughout the grainbelt in Saskatchewan. Inflows to Lake Diefenbaker are expected to be 60 percent of normal. Operation plans for the summer are to maintain the releases at 50 m^3/s. The reservoir is only expected to reach a peak level of 553.2 m, more than 3.6 metres below full supply level. Water supplies in Manitoba's lakes, reservoirs and rivers were generally fair to good as of June 30, 1987. Water levels had declined significantly since the spring peaks in most areas and were still generally declining as of late June due to continuing dry weather. Evaporation losses were greater than normal because unusually warm weather has raised water temperatures to above average values. Water supplies for the production of hydroelectricity were only fair as of late June and could be poor by August if generally dry weather were to continue.

There are reports of declining water levels in shallow wells in the Medicine Hat District of Alberta. Shallow wells are reported to be going dry in the Gravelbourg District of Saskatchewan and declining water levels are reported in the Melfort District.

Groundwater supplies were generally good across the Province of Manitoba as of June 30.

Low soil moisture levels are reported in many locations across the southern prairies. More general shower activity has recently improved the overall outlook. However, the areas that remain dry include southern Alberta; west central, southwest, parts of central and south central regions and the Tisdale area of Saskatchewan; and parts of southwest Manitoba.

Pastures will benefit greatly from the early July rainfall. Conditions on pastures had deteriorated significantly across much of the Prairies as dry spring weather depleted the soil moisture supplies. Pastures are expected to improve in many areas; however, general rains are still required across the Prairies. Dryland hay production has been poor as well. Feed supplies are not a major concern at present, due to the carry-over from 1986, but producers in many areas are beginning to look for hay to purchase.

With dry and at times windy weather, this has not been a good year for wind erosion control. Cultivated small grain and oilseed fields on sandy, loamy sands and well worked heavy clays are at risk across the Prairies.

No urban centres with populations over 2000 are experiencing water supply problems due to drought, with the exception of Kindersley, Saskatchewan. Lawn watering restrictions are imposed at Kindersley to reduce the demand on water supplies during this drought period.

Many smaller communities (populations less than 2000) impose rationing during dry periods. This is quite prevelant just north of Calgary where very dry spring weather has caused Didsbury, Olds and Innisfail to impose restrictions. Water supply problems are being experienced in isolated communities across Saskatchewan including Limerick, Mazenod, Quill Lake and Markinch. There are no reports of drought related water supply problems in Manitoba.

On-farm water supplies are generally rated good in the northern parts of the prairie provinces and across the Province of Manitoba. Supplies in southern Alberta range from extremely low to adequate. Parts of the west central region of Saskatchewan are rated inadequate and supplies are generally adequate across the remainder of southern and central Saskatchewan. The Melfort area east of Tisdale has been abnormally dry and dugout pumping is required in this area.

Crop conditions are highly variable due to the spotty nature of the rainfall. Below normal yields may be expected to occur in south and south central locations of Alberta, western and northeastern Saskatchewan and southern Manitoba.

CLIMATE

Alberta

May was generally warmer and drier than normal across the Province of Alberta. Warm temperatures early in the month permitted farmers in southern Alberta to finish seeding two weeks ahead of normal. Many record breaking daily maximum temperatures were obtained in May.

Precipitation totals were low from the Coronation, Provost, Wainwright area to the southern Alberta border. The lack of rainfall resulted in dry soil moisture conditions and uneven germination of the later seeded crops.

Cooler temperatures descended from the north on May 18. The cold low pressure system dumped 20 cm of wet snow at Edmonton. All northern regions north of the Coronation, Provost, Wainwright area received some snowfall. The mercury dropped to -8.9°C at Edmonton on the 20th and temperatures of -6 to -8°C were experienced in all southern areas. This caused extensive frost damage to alfalfa and cereal and some specialty crops in Alberta.

Hot temperatures returned to Alberta in the latter part of May. The month of June was dominated by above average temperatures. The most significant weather event in early June was a wind storm that hit most of the province on May 30th to June 2nd.

Rainfall was, for the most part, spotty during June. Less than normal amounts of precipitation fell in most agricultural areas. During the third week of June some much needed rainfall occurred over much of the agricultural region.

General rains were received in all regions of the province during the first week of July. The least amount of rain during the early July period was received in the Peace River and southern agricultural region (Figure 1).

Saskatchewan

May was the sixth consecutive month of above normal temperatures in Saskatchewan. Mean temperatures ranged from 1 to 4°C above seasonal values. Weather was ideal for seeding and early seeded crops germinated well. Frost damage was less extensive in Saskatchewan where crops hit by frost in the northern parts of the province recovered by the end of May.

The first significant rainfall of the season occurred during the last week of May. Rainfall totals were low in the extreme southwest, west central, Broadview, Prince Albert and Melfort-Tisdale areas of the province.

In June temperatures averaged 2 to 3°C above normal. Numerous record breaking temperatures were reached during a heat wave

which lasted until June 22. A cooler air mass moved into Saskatchewan on June 22nd and helped to reduce the widespread crop stress caused by heat and lack of moisture.

Most of the rainfall during June was in the form of light scattered shower activity. The usual summer severe local weather conditions caused by high temperatures were reported throughout the province. Sunshine was abundant and less than the usual amount of precipitation fell in southern areas. Agricultural areas received between 50 to 75 percent of the normal June total with some areas such as Maple Creek and Shaunavon receiving less than 50 percent of normal rainfall.

The first two weeks of July brought more general rains to the province of Saskatchewan, particularly the central and northern agricultural regions. The Tisdale, Kindersley to Rosetown, Maple Creek to Shaunavon areas continue to be dry.

Manitoba

Mean temperatures were generally 1 to 4°C above normal during the month of May. On the 23rd day of the month minimum temperatures dipped generally between -2 and -4°C. There were no reports of significant damage to crops.

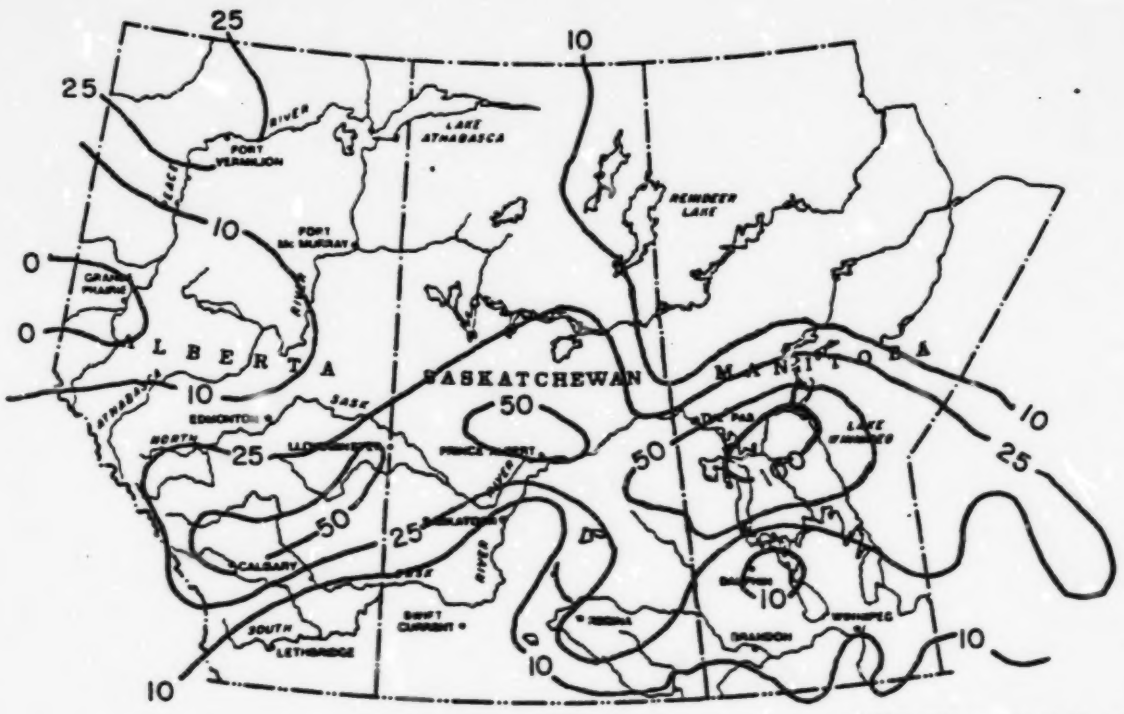
The beginning of May was fairly dry. More unsettled weather during the latter half of the month produced shower and thunder shower activity throughout agricultural areas. In Manitoba, however, precipitation amounts were well below normal with between 20 and 40 mm reported compared to a normal of 50 to 65 mm.

During June the temperatures remained hot. Sunshine was abundant at all locations. Total hours of sunshine were as high as 112 hours above normal at Brandon, Manitoba.

Precipitation amounts remained below normal in southern areas; however, northern locations in the province received near or above normal amounts of rainfall during June. Agricultural areas received 50 to 75 percent of the usual June total. Rainfall was more general in the northern agricultural regions during the first week of July. Throughout the south central region of Manitoba the seasonal rainfall total was less than 60 percent of normal for the period April 1 - July 6, 1987 (Figure 2). During the week of July 7-13, 1987 rainfall totals ranged from 25 to 50 mm across much of the south central region of Manitoba.

5.

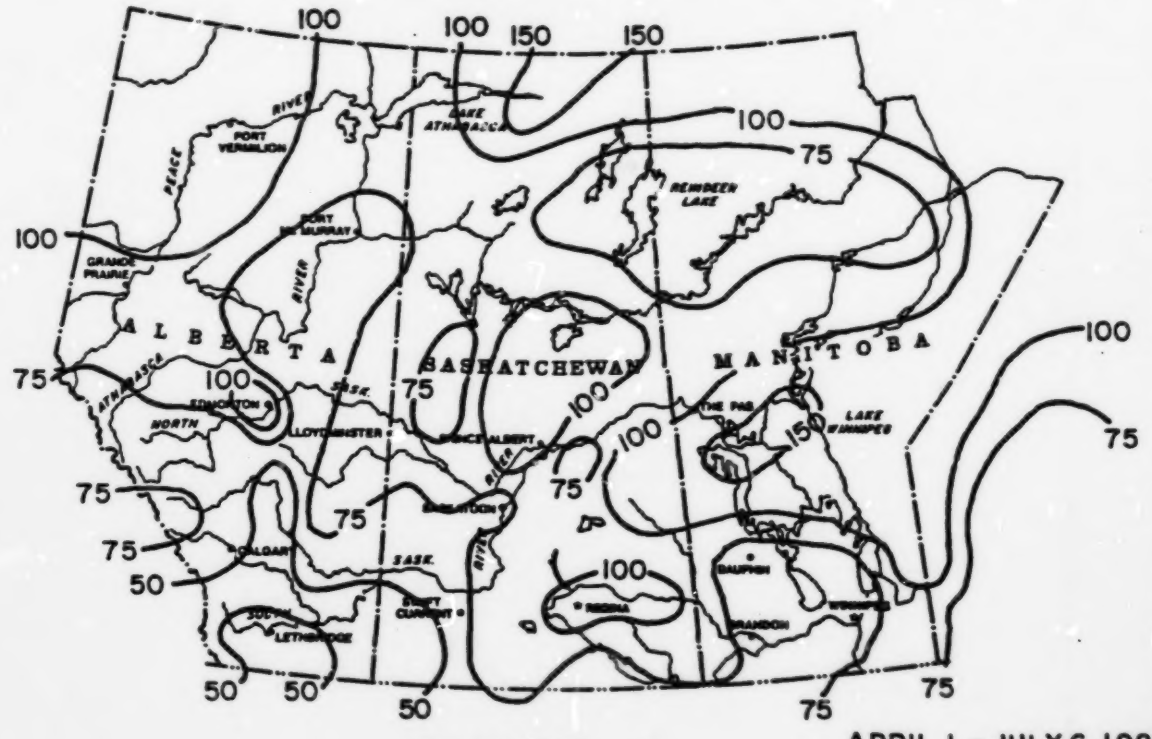
TRACED FROM MAP PROVIDED BY
CLIMATE SERVICES - AES CENTRAL
REGION



JUNE 30 - JULY 6, 1987

FIGURE 1

TOTAL PRECIPITATION (mm)

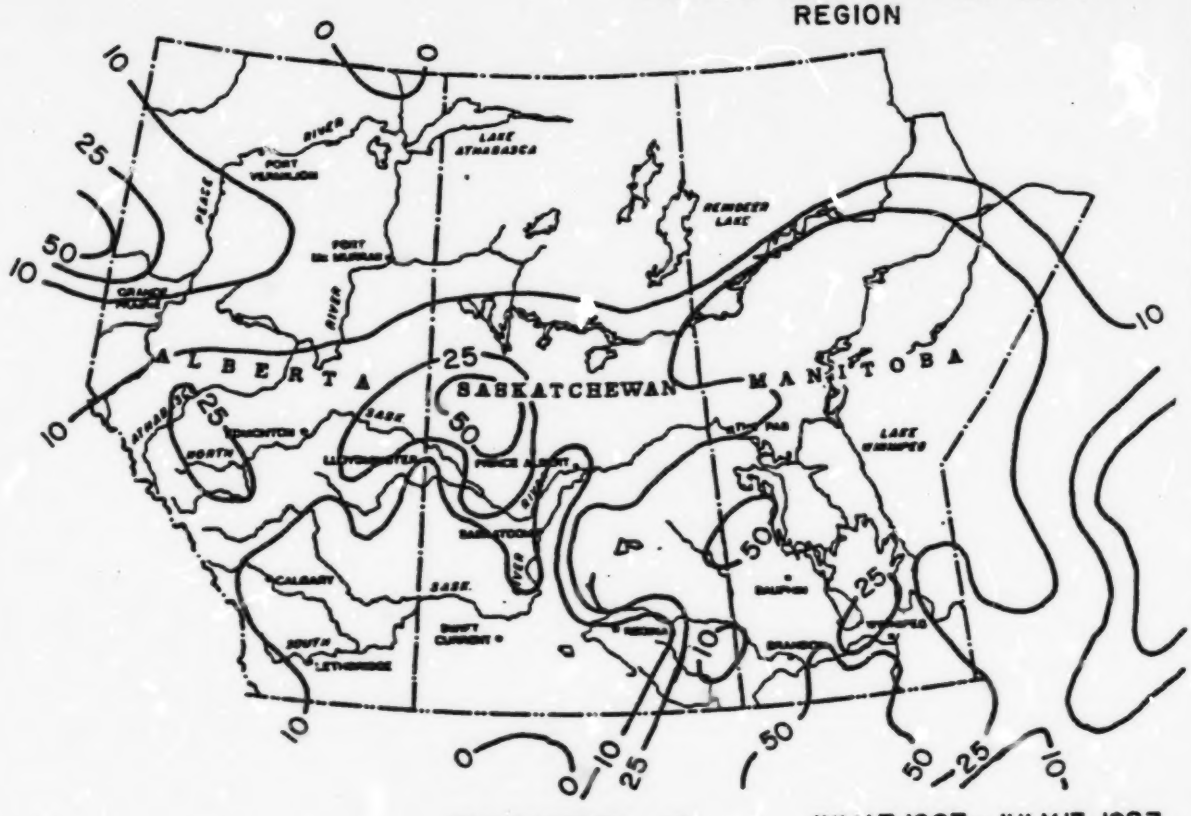


APRIL 1 - JULY 6, 1987

FIGURE 2

PERCENT OF NORMAL PRECIPITATION

TRACED FROM MAP PROVIDED BY
CLIMATE SERVICES - AES CENTRAL
REGION



JULY 7, 1987 - JULY 13, 1987

FIGURE 3

TOTAL PRECIPITATION (mm)

HYDROLOGY

Alberta

The warm temperatures that occurred in the eastern Rocky Mountain slopes caused rapid snowmelt runoff during early May. Cold temperatures that brought frost to much of agricultural Alberta slowed the melt during the May 18 to May 25 period, resulting in falling or steady flows. By the end of May a return to warm temperatures brought a rise in flows in the Bow, North Saskatchewan, Athabaska and Peace river basins as a result of increased snowmelt in the high elevations. Rivers in the Oldman Basin were generally flowing at low levels, with the exception of Waterton and St. Mary rivers, which rose due to heavy precipitation. The Bow River was flowing at below normal levels. In mid-June streams in the southern and central regions of Alberta were flowing at below normal levels. The early snowmelt and general lack of rain caused little runoff to be generated. Rivers originating in the mountains of the North Saskatchewan, Athabaska and Peace river basins were generally flowing at normal levels.

By early June the water supply outlook had deteriorated considerably and it was apparent that there was a high probability of water supply deficiencies during the summer in southern Alberta. This was due to the lack of rainfall in May and because the warm temperatures, which caused snowmelt and peak discharges to occur during the first two weeks in May. Runoff was three to four weeks earlier than normal.

Throughout the latter half of June streamflows generally remained below normal. Table 1 indicates streamflows for July 7, 1987 according to the Alberta River Forecast Centre.

Precipitation occurred in the eastern slopes from July 3 to 6, resulting in slight to moderate increases in streamflows in southern and central Alberta.

As of July 1, 1987, natural water supply volumes for major rivers of southern and central Alberta are expected to range as follows:

1. Well below average on the Milk and Oldman river basins.
2. Below average on the Red Deer and Bow river basins.
3. Near average on the North Saskatchewan River basin.

The following (Table 2) are natural streamflow projections prepared by Alberta Environment (July 1, 1987) for the period July 1 to September 30. The forecasts are based on snow surveys, winter and spring precipitation data, and the trend of natural flow in recent months. The seasonal minimum is based on the lower decile range from historical recorded precipitation.

TABLE 1

STREAMFLOWS JULY 7, 1987
ALBERTA RIVER FORECAST CENTRE

River Location	July 7 Flow m^3/s	Historical Mean Flow July 7-14	Remarks
Milk at Milk River	16.0	20.0	Normal, falling
Oldman near Lethbridge	6.1	126.0	Below normal, falling slowly
Bow at Calgary	121.0	199.0	Below normal, fluctuating
South Saskatchewan at Medicine Hat	34.0	392.0	Below normal, expected to rise
Red Deer at Red Deer	91.0	87.0	Normal, expected to fall
North Saskatchewan at Edmonton	218.0	313.0	Normal, fluctuating

Demand for irrigation water has been greater than normal; however, irrigation storage is generally good. The Lethbridge Northern Irrigation District expects shortages if adequate rain is not received in time. Willow Creek is short of water and shutdowns have occurred. The Highwood-Little Bow irrigation is expected to have shortages.

Transalta Utilities indicates that hydroelectric production will be below normal at Big Horn on the North Saskatchewan River System and on the Bow River System this year

Saskatchewan

Water supply conditions have generally deteriorated throughout the grainbelt as a result of the below normal spring precipitation. However, most of the reservoirs in the southwest corner of the province have remained at acceptable levels to provide a second irrigation this summer. All irrigation projects provided a first irrigation delivery in May. The second irrigation delivery began at most projects during the fourth week of June. Consul irrigation project will have no second irrigation delivery. East Val Marie and West Val Marie will receive water on one half and three-quarters of the project acreage respectively. All other users in the Southwest Irrigation Project will receive a full second irrigation.

TABLE 2
WATER SUPPLY OUTLOOK FOR SOUTHERN AND CENTRAL ALBERTA
AS OF JULY 1, 1987 (Natural Flow)

Location	Volume Forecast 10^6 m^3*	% of Average	Probable Range %	Reasonable Minimum %
MILK RIVER BASIN				
Milk River	4	25	5-50	0
OLDMAN RIVER BASIN				
St. Mary River	180	70	55-90	45
Belly River	60	65	55-90	45
Waterton River	100	60	45-90	40
Oldman River near Brocket	190	65	40-85	30
Oldman River near Lethbridge	560	60	45-80	30
BOW RIVER BASIN				
Bow River at Banff	460	81	70-90	65
Bow River at Calgary	950	75	65-85	60
Elbow River	53	60	50-80	45
Highwood River	100	48	40-80	30
Lake Minnewanka Inflow	78	75	60-90	45
Spray Lake Inflow	130	82	65-90	40
Kananaskis River	160	81	70-90	60
RED DEER RIVER BASIN				
Gleniffer Lake Inflow	270	65	60-95	50
Red Deer River at Red Deer	330	65	60-95	50
NORTH SASKATCHEWAN RIVER BASIN				
Lake Abraham Inflow	220	85	80-100	75
Brazeau Reservoir Inflow	660	90	80-100	75
N. Saskatchewan R. at Edmonton	2 500	80	70-100	65

*10^6 m^3 = dam^3 = 811 acre-feet = 409 cfs-days

Notes: Volume forecasts are based on snow surveys, winter and spring precipitation data, and the trend of natural flow in recent months. Forecasts indicate natural (July-September unless indicated otherwise) runoff expected for the season; actual streamflow conditions may vary throughout the season as a result of the effects of streamflow diversion and reservoir storage.
There is a 50% chance that the actual natural flow for the season will fall within the probable range given; there is a 25% chance that the actual natural flow will be less than the lower bound of the probable range given; there is a 10% chance that the actual natural flow will be less than the reasonable minimum.

Source: Alberta River Forecast Centre

Water levels at Boundary Reservoir remain below normal (2.3 m below full supply level). The water quantity at Boundary Dam generating station is adequate for plant operation although the poor water quality is causing some operational problems. At Cookson Reservoir water levels are slightly above normal.

Streamflow in the lower Qu'Appelle River basin has been below normal this year. The lakes on the Qu'Appelle River are currently within, or slightly above, the desirable operating ranges for this time of year. Releases are being made from the Qu'Appelle River Dam to augment the flows in the upper Qu'Appelle River basin to supply municipal water at Regina and Moose Jaw and help offset evaporation losses on the lakes.

The inflows to Lake Diefenbaker this spring were well below normal as a result of the well below normal precipitation received in the headwaters of the South Saskatchewan River basin. The water supply outlook for the South Saskatchewan River basin is for 60 percent of normal inflow to Lake Diefenbaker during the period July 1 to October 31, 1987. To help fill the reservoir, releases were reduced to 50 m^3/s in late May. Operation plans for the summer are to maintain the releases at 50 m^3/s. The reservoir is only expected to reach a peak level of 553.2 m this year, more than 3.6 m below full supply level.

Flows in the North Saskatchewan River are currently below normal and below normal flows are expected during the remainder of the summer.

Flows in the Churchill River basin are slightly below normal and are expected to remain slightly below normal throughout the summer.

Table 3 illustrates the status of selected lakes and reservoirs as of late June, 1987.

Table 4 illustrates accumulated streamflow volumes for selected locations on the Prairies for the period January 1 to June 30, 1987. Comparative high and low years are included in the table.

Manitoba

Most lakes and reservoirs were within their desirable range as of late June. However, the levels of Lake of The Woods, Cedar Lake and Pelican Lake were well below desirable levels. Levels of most lakes along the Winnipeg River were below the desirable range due to low flows on the Winnipeg River.

Smaller reservoirs operated by the Province, including those with fixed crests, were generally below the full supply level but still close to the long term average. Even if relatively dry weather were to continue, supplies would be generally adequate through to the 1988 spring recharge. Pumping from the Assiniboine River may be required to replenish small reservoirs

TABLE 3
STATUS OF TYPICAL STORAGE RESERVOIRS IN ALBERTA, SASKATCHEWAN AND MANITOBA

Province	Reservoir	Drainage Basin	Present Storage (dam^3)	% of Maximum Live Storage	Date of Reading (1987)	Remarks
Alberta	St. Mary	Oldman	351 000*	95	01/07	Normal
	Lake Minnewanka	Bow	109 000*	49	01/07	Below Normal
	Spray Lake	Bow	115 000*	44	01/07	Normal
	Lake McGregor	Bow	216 000*	66	01/07	Normal
	Lake Abraham	North Sask.	312 900*	22	01/07	Normal
	Waterton	Oldman	97 000*	85	01/07	Normal
Saskatchewan	Lake Diefenbaker	South Sask.	7 726 900	59**	30/06	Well Below Normal
	Boundary -Power Intake	Souris	46 800	66	01/07	Well Below Normal
	Cypress Lake -Battle River Diversion	Frenchman	64 760	37.2	29/06	Well Below Normal
	-Frenchman River Diversion			37.0		
	Downie	Maple Creek	8 141	70	24/06	Normal
	Last Mountain Lake	Qu'Appelle	1 785 200	-	28/06	Desired Range
	Cookson -Power Intake	East Poplar	38 700	88	29/06	Slightly Above Normal
Manitoba	Lake Winnipeg	Nelson	-	-	30/06	Desired Range
	Lake of the Prairie (Shellmouth)	Assiniboine	375 000	78	31/06	Desired Range
	Morden	Deadhorse Creek	3 605	91	19/06	Desired Range
	Cedar Lake	Saskatchewan	-	-	30/06	Desired Range
	Lake of the Woods	Winnipeg	-	-	30/06	Desired Range

* Useable or live storage.

** Live storage at Lake Diefenbaker is defined as design-operating live storage or the storage between the minimum operating level and FSL as defined in Section D-1 of the annual report series "Operation of the Saskatchewan River System" prepared by Saskatchewan Environment.

Water levels supplied by Water Survey of Canada, Alberta Environment, Saskatchewan Environment, Manitoba Natural Resources, and PFRA (Soil and Water Conservation Service).

TABLE 4
ACCUMULATED STREAMFLOW VOLUMES AT SELECTED POINTS IN THE PRAIRIE PROVINCES
FOR THE PERIOD JANUARY 1 TO JUNE 30, 1987

STATION NO.	STATION NAME	1987 ACCUMULATED STREAMFLOW VOLUMES FOR JANUARY 1		COMPARATIVE ACCUMULATED STREAMFLOW VOLUMES FOR JANUARY 1 - JUNE 30 ($1000\ dam^3$)			
		VOLUME ($1000\ dam^3$)	% OF LONG-TERM MEAN	1986	1984	1981	1977
	ALBERTA						
05AA024	Oldman R. Near Brocket	642	73	1 000	461	1 171	314
05AE027	St. Mary R. At International Boundary	261	65	396	212	331	162
05AJ001	South Sask. R. At Medicine Hat	1 940	51	3 346	1 234	4 630	1 230
05BL024	High R. Near the Mouth	196	50	374	160	591	144
05CC002	Red Deer R. At Red Deer	471	58	755	385	786	507
06AD006	Beaver R. At Cold Lake Reserve	258	61	142	206	178	246
07BB002	Pembina R. Near Entwistle	172	48	276	229	288	510
07GE001	Wapiti R. Near Grande Prairie	1 569	63	1 681	1 035	1 700	2 109
	SASKATCHEWAN						
05FE004	Battle R. At Alberta Boundary	167	83	152	74	130	54
05GG001	North Saskatchewan R. At Prince Albert	3 370	100	4 050	2 710	3 662	3 317
05HD036	Swift Current Creek Below Rock Creek	24.9	84	27	7	13	10
05JE001	Moose Jaw R. Above Thunder Creek	1.96	30	4	0	0	4
05MD004	Assiniboine R. At Kamsack	99.6	56	370	554	69	68
05ND001	Souris R. Near Glen Ewen	36.8	22	208	96	26	43
05LC001	Red Deer R. Near Erwood	162.3	39	30	10	9	9
05CD002	Churchill R. At Otter Rapids	4 350	108	3 330	2 450	3 644	4 617
	MANITOBA						
05KH007	Carrot River Near Turnberry	187	38	-	359	126	152
05LJ005	Ochre R. Near Ochre R.	19.4	48	-	69	21	9
05MF001	Little Saskatchewan R. Near Minnedosa	94.1	112	34	150	39	24
05OB007	Pembina R. Near Windy Gates	180	118	19	134	28	6
05OC001	Red R. @ Emerson	1 499	69	3 010	1 615	508	309
05OD001	Roseau R. Near Dominion City	77.6	38	184	512	43	20
05SA002	Brokenhead R. Near Beausejour	47.1	54	-	110	8	6

along the La Salle River later this summer, if dry weather continues.

During late June, 1987, flows were below the long-term average on the Red River, the Assiniboine River, the Souris River and on most smaller streams in southern Manitoba. Flows were also below average on the Nelson River and somewhat below average on the Churchill river. Flows were well below average on the Winnipeg River and the Saskatchewan River.

A significant concern has developed with respect to water supplies for hydroelectric generation. Much below normal storages and flows in the Winnipeg River and Saskatchewan River watersheds are the main reason for the concern. Water supplies in the Churchill River watershed and in Lake Winnipeg are still close to normal. The normal levels on Lake Winnipeg are attributed largely to the reduced controlled outflows from the lake which commenced in early May, 1987. Manitoba Hydro is storing water in Lake Winnipeg for use next winter. Hydro has commenced thermoelectric power generation at Brandon and Selkirk in order to supplement generation in its vital southern AC network. While most of Manitoba Hydro's power is transmitted via DC from the Nelson River, the southern system (i.e. Saskatchewan River, Winnipeg River and thermoelectric plants) must exceed a specified percentage of total power generation in order to maintain stability of the entire system and prevent blackouts. The poor water supply situation in the southern network is therefore of particular significance.

There is considerable concern with respect to power generation during the coming winter if below normal precipitation continues for a few more months. This concern is accentuated by the fact that winter releases from Lake Winnipeg are limited by ice conditions at the outlet. Precipitation in the Winnipeg River and Saskatchewan River watersheds would have to be well above normal from July through October in order to assure optimum water supplies for hydroelectric generation during the winter of 1987-88.

GROUNDWATER

Alberta

In the Lethbridge District there are no problems foreseen with groundwater supplies this year; however, there is some concern expressed for conditions next year if the dry conditions continue.

Groundwater levels are declining in the Medicine Hat District. Reports indicate a decline of as much as 0.6 m this season and declining water levels are reported by the Hamlet of Hilda and Schuler.

The remainder of the Province of Alberta reports no groundwater problems.

Saskatchewan

There have been several reports of shallow wells going dry in the Limerick/Flintoft and Bateman/Shamrock areas of the Gravelbourg District. This shortage of groundwater has been anticipated due to the continual declining trend in shallow aquifers in the southwest corner of the province. If water demands remain high further shortages are anticipated.

There are scattered reports of shallow seepage wells going dry in the Swift Current area. Both the Moose Jaw and Weyburn districts report below normal shallow well levels; however, widespread shortages are not anticipated.

In the Melfort District some shallow wells are reported to have dropped during the winter and have experienced no recharge. Many of these wells cannot maintain their normal pumping rate.

Manitoba

In most of Manitoba groundwater levels are near average. The only significant exceptions are extreme southeastern Manitoba and the Winkler area where groundwater levels are still up to two metres below average. However, the downward trend in these areas has levelled off.

Even if the dry weather continues, only a normal decline of groundwater levels may be expected. Groundwater supplies are expected to be adequate through this summer and the following winter.

SOIL MOISTURE

In general terms, dry weather persisted across the Prairie region during the 1987 growing season until early July. Most of the rainfall has been from localized convective activity. This makes the situation highly variable and it is very difficult to accurately assess soil moisture reserves. During the first two weeks of July general rainfall was received; however, this was most significant throughout the south central, central and northern agricultural regions (Figures 1, 3). Southern locations, which have been dry, generally did not receive significant amounts of rainfall. The least amount of rain was reported in the Medicine Hat to Foremost and eastern Peace River to Grand Prairie areas in Alberta. Moisture recharge was only spotty in southern Saskatchewan with southwest and west central Saskatchewan receiving the least amount of rain.

While some additional moisture has been received in Manitoba, soil moisture levels can only be rated fair in the central

region, and fair or poor in the southwest region. Much of southern Manitoba remains in a deficit moisture position with less than 60 percent of normal seasonal rainfall to date.

Figures 4 and 5 illustrate moisture conditions as of July 7, 1987. In the week following July 7, moisture conditions were most improved in northwest Saskatchewan and northeast Alberta, eastern Saskatchewan and south central Manitoba, and the Swan River areas of Manitoba.

According to the Soil Moisture Evaluation Project (SMEP) as of July 7 moisture reserves were above normal across the northern half of Alberta and Saskatchewan. Central Saskatchewan and much of Manitoba remain well below normal for this time of year for both stubble and fallow fields (Figure 6).

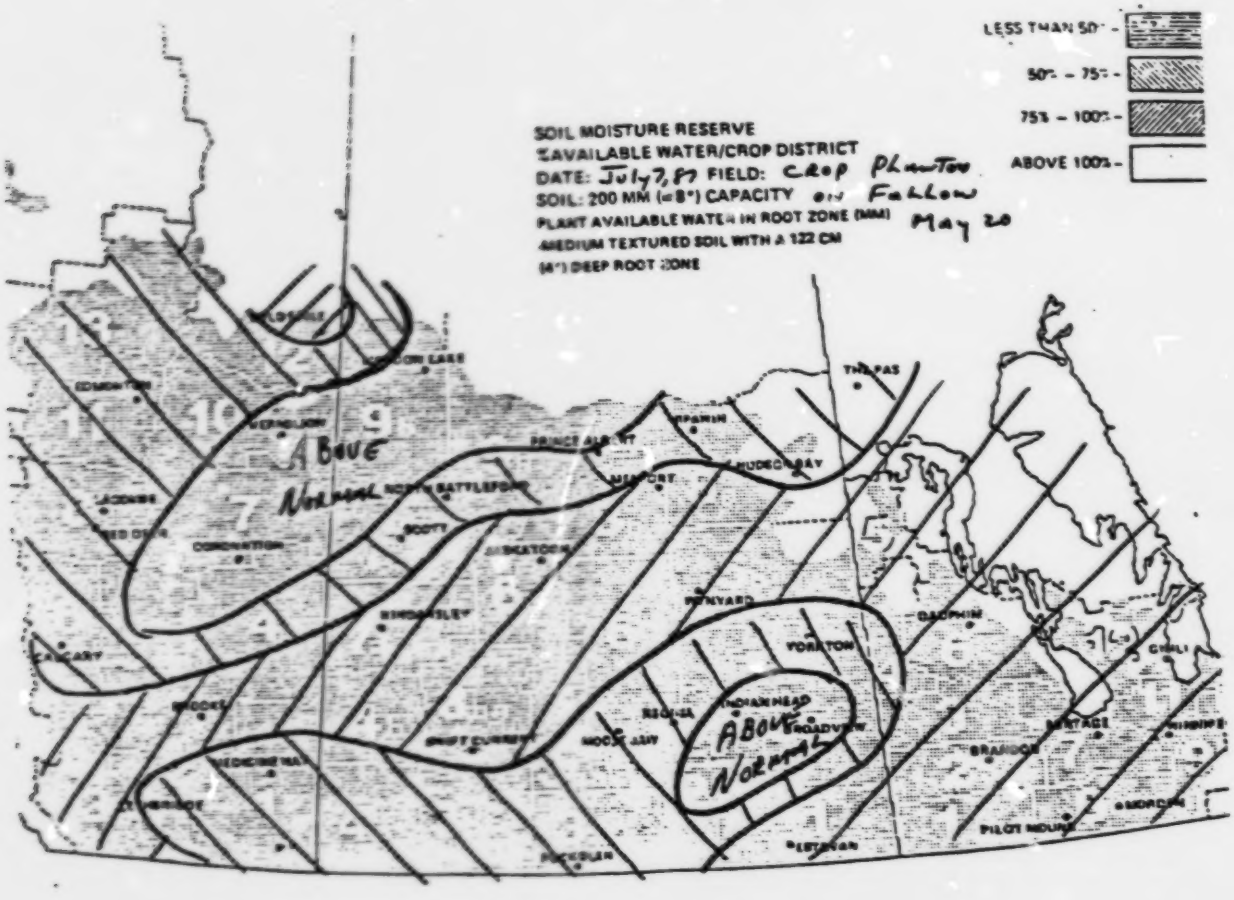

LESS THAN 50% -
50% - 75% -
75% - 100% -
ABOVE 100% -
SOIL MOISTURE RESERVE
AVAILABLE WATER/CROP DISTRICT
DATE: July 7, 87 FIELD: Crop Plowtow
SOIL: 200 MM (=8") CAPACITY or Fallow
PLANT AVAILABLE WATER IN ROOT ZONE (MM) May 20
MEDIUM TEXTURED SOIL WITH A 122 CM
(48") DEEP ROOT ZONE
ABOVE NORMAL
ABOVE NORMAL

Figure 6

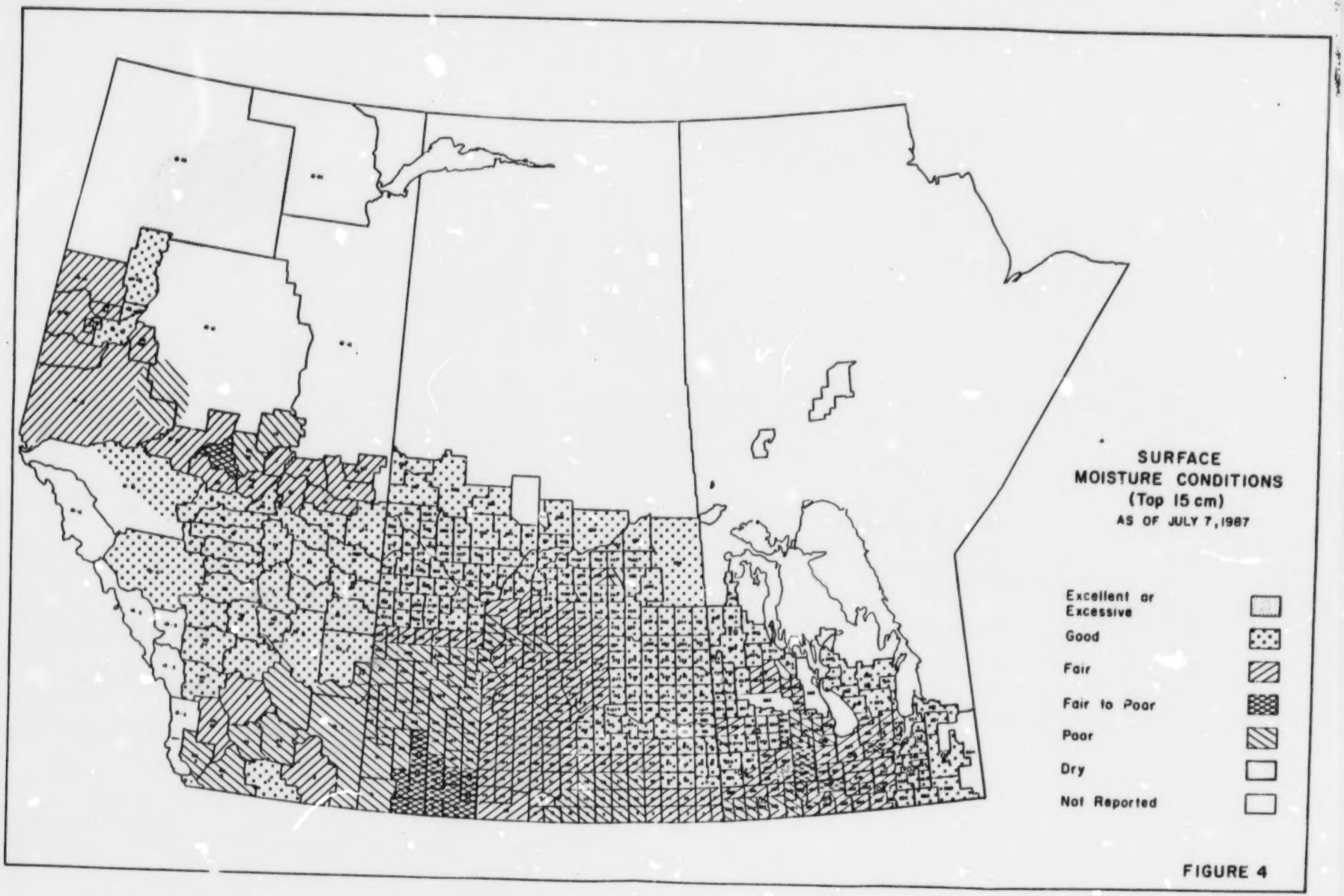

SURFACE
MOISTURE CONDITIONS
(Top 15 cm)
AS OF JULY 7, 1987
Excellent or Excessive
Good
Fair
Fair to Poor
Poor
Dry
Not Reported

FIGURE 4

16

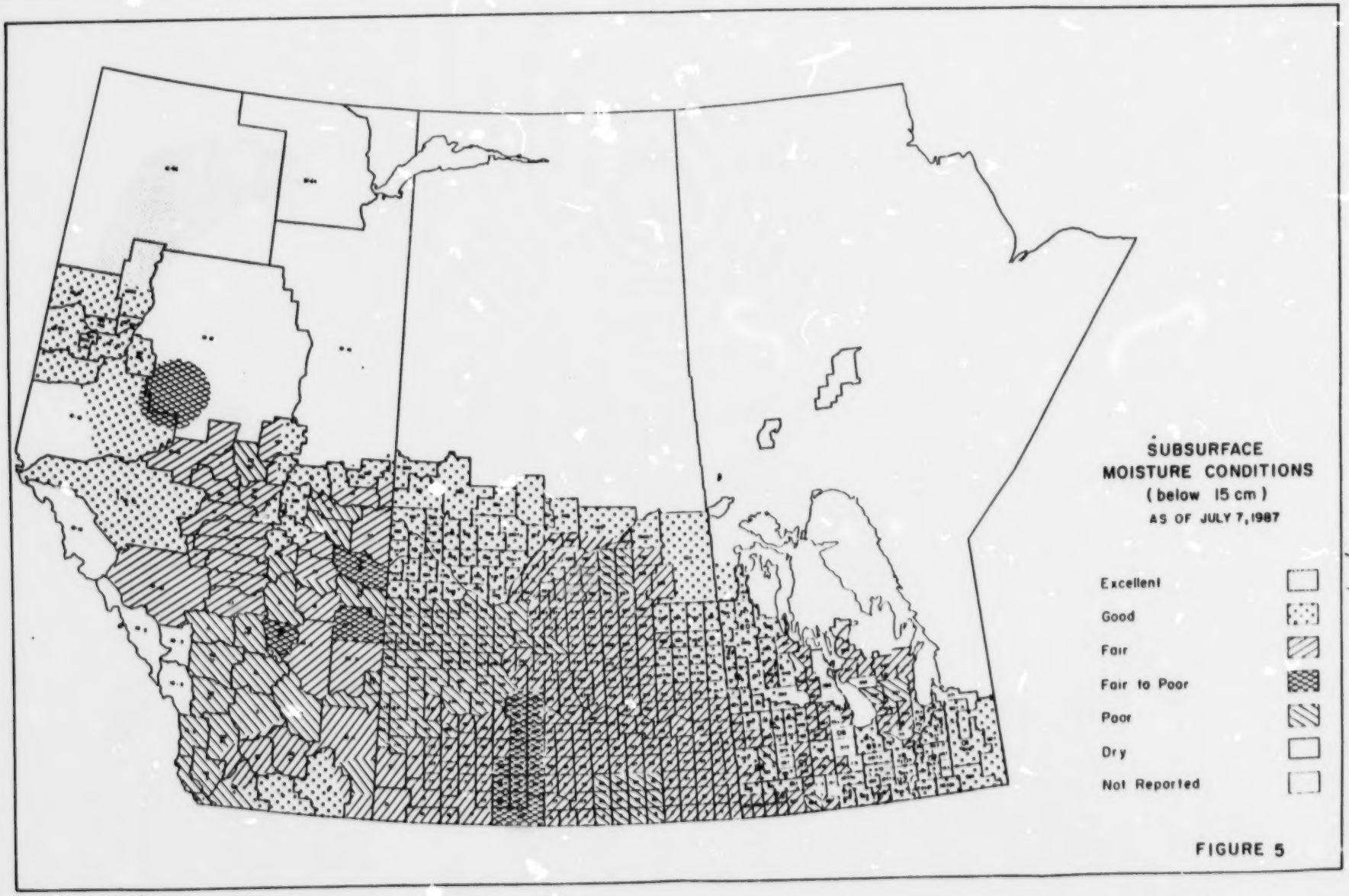

SUBSURFACE
MOISTURE CONDITIONS
(below 15 cm)
AS OF JULY 7, 1987
Excellent
Good
Fair
Fair to Poor
Poor
Dry
Not Reported

FIGURE 5

PASTURES AND HAYLANDS

Alberta

Pasture conditions are generally rated poor in southwest Alberta. The eastern half of the Southern region reported fair pasture conditions. In the northern part of the M.D. of Pincher Creek #9, the M.D. of Willow Creek #26, the County of Vulcan #2 and the M.D. of Foothills #31 farmers are turning cattle onto cropland, or are supplementing their feed supply in the pasture or taking cattle to feedlots. Hay yields in the southern region, which have been significantly reduced by frost and drought are expected to range from 1.1 to 2.2 tonnes per hectare (0.5 to 1.0 tons per acre) on dryland and average 4.5 tonnes per hectare (2 tons per acre) under irrigation.

In the South Central region hay yields range from .5 to 1.7 tonnes per hectare (.25 to .75 tons per acre) and producers are arranging to purchase winter hay supplies. Pastures are rated poor in this region.

In the North Central region pastures, which are rated poor, should benefit substantially from recent rains. Dryland hay yields range from 1.7 to 3.3 tonnes per hectare (.75 to 1.5 tons per acre) around Olds and .5 to 1.7 tonnes per hectare (.25 to .75 tons per acre) around Coronation.

In the Northeast Region pastures are rated fair to poor. Some livestock producers have placed livestock on low yielding hay fields because of poor pasture conditions. Yields of less than 2.2 tonnes per hectare (1 ton per acre) have generally been reported on haylands.

Pastures in the Northwest region are rated good south of Morinville and fair to the north and west. The hay cut is presently 30 percent complete with yields ranging from 1.7 to 2.8 tonnes per hectare (.75 to 1.25 tons per acre).

Pastures are rated in good condition in the Peace River region with the exception of I.D. #17. Hay yields are less than 2.2 tonnes per hectare (1 ton per acre) except in the Manning and High Level areas where yields exceed 2.8 tonnes per hectare (1.25 tons per acre).

Irrigated hay production is expected to be normal. Due to the longer anticipated growing season there is good potential for three cuttings of irrigated hay in southern Alberta.

Saskatchewan

Pasture conditions are rated fair in the Maple Creek District. Conditions are generally dry at this time.

In the Shaunavon District pastures have begun to turn brown; however, good grazing is anticipated well into the fall.

Pastures range from fair to poor throughout the remainder of southern Saskatchewan.

In the Rosetown District pasture conditions range from fair to poor. Cattle may be removed early from pastures in the area of R.M.s # 318 to #322, #349 to #352 due to poor grass and lack of water.

Pastures are generally poor throughout the Watrous District and conditions generally improve to the east.

In the North Battleford District pasture conditions are good.

Pastures are rated poor in the Melfort-Tisdale area. Conditions are fair to good elsewhere in the Melfort District in the northeast region of the province.

The hay crop in Saskatchewan is expected to yield 40 to 50 percent below average. Early estimates of tame hay yields are 1.5 to 2.6 tonnes per hectare (0.7 to 1.2 tons per acre) about half to two-thirds of average in central and northern regions. In west central districts an estimated 0.9 tonnes per hectare (0.4 tons per acre), approximately 35 to 40 percent of normal yields are anticipated. Yields in southwest Saskatchewan are expected to be about 85 percent of average, equal to 2.0 tonnes per hectare (0.9 tons per acre). Across the remainder of south central and southeast Saskatchewan hay yields are estimated at 1.1 to 2.0 tonnes per hectare (0.5 to 0.9 tons per acre), which is 40 to 60 percent of average.

Grass conditions at PFRA Community Pastures vary significantly across the Province of Saskatchewan. This is due to the spotty nature of the rainfall received this season. There is a potential for early take-out in the Kindersley to Kerrobert areas. Cattle may be taken off early at Dundurn, Usborne, Wreford and Kelvington pastures in central and eastern parts of the province if grass conditions aren't improved with rainfall.

Manitoba

Pastures in southwest Manitoba are generally rated fair to poor. Elsewhere in the province pastures are in fair condition.

Conditions on PFRA Community Pastures have deteriorated in the Brandon area due to the persistence of hot, dry weather in April to June. Grass conditions are poor at Spy Hill-Ellice and Ellice-Archie pastures. Grass growth has been below average in the Dauphin area. Sylvan Dale pasture in the Interlake Region will probably remove cattle early due to poor grass conditions.

Haying operations are reported to be nearing completion in Manitoba. Below average yields are reported at most locations. In the central and eastern regions hay yields have been reported in the 2.2 to 3.3 tonnes per hectare (1 to 1.5 tons per acre) range. A significant reduction in yields is also anticipated in the Interlake Region; however, good regrowth is being reported for a second cut.

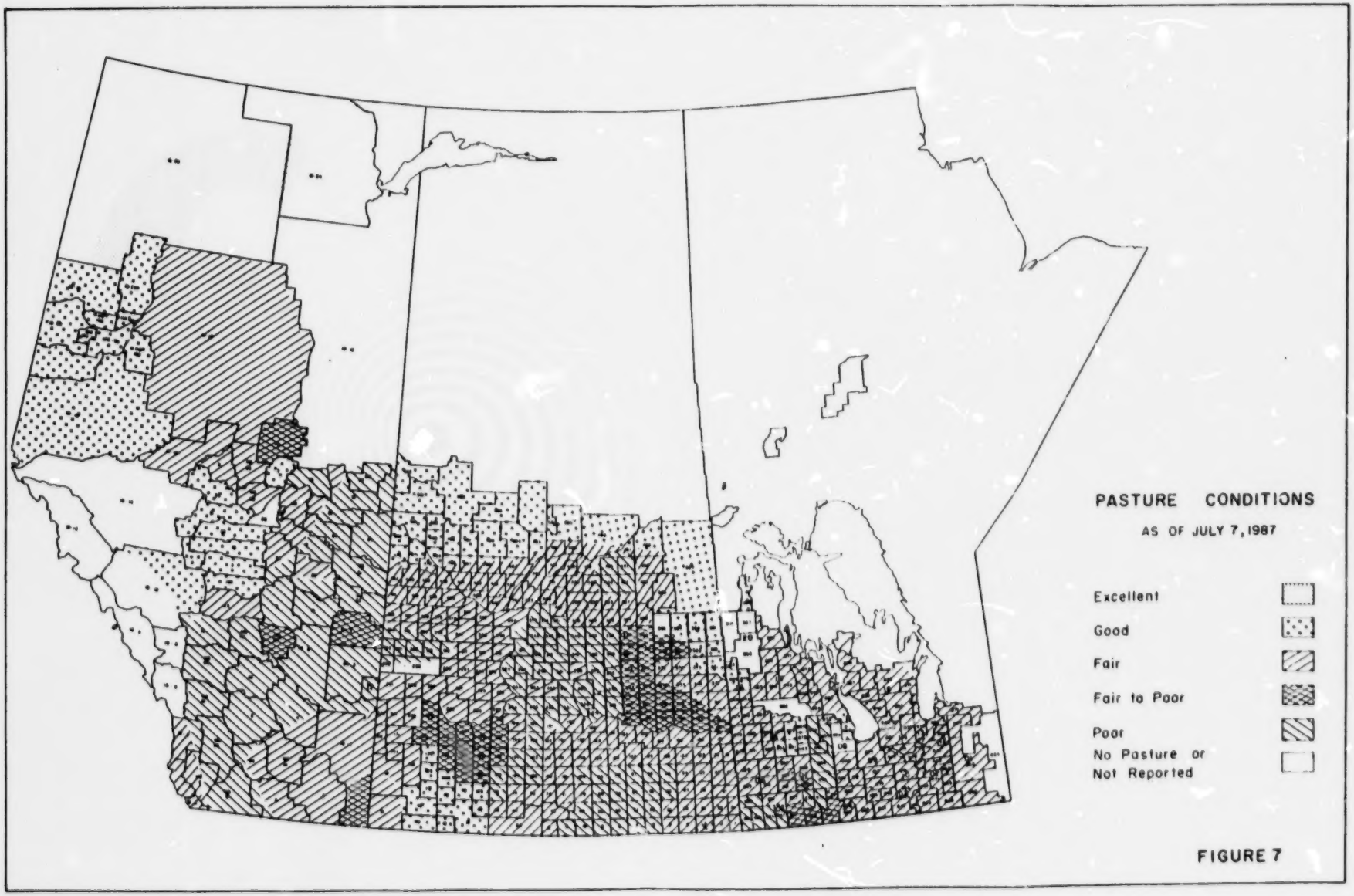

PASTURE CONDITIONS
AS OF JULY 7, 1987
Excellent
Good
Fair
Fair to Poor
Poor
No Pasture or
Not Reported

FIGURE 7

12

WIND EROSION

According to a recent crop residue survey of Alberta, Saskatchewan and Manitoba in 1987, conventional summerfallow has insufficient crop residue cover to prevent erosion. Cultivated small grain and oilseed fields, on sands, loamy sands and well worked heavy clays in the Lethbridge area of Alberta, Swift Current, Rosetown, Watrous and Weyburn areas of Saskatchewan; and in the Dauphin, Brandon and Morden areas in Manitoba are at risk particularly if summerfallowed in 1987.

Alberta

In a report to the Alberta Drought Monitoring Committee estimates were made of the extent of wind erosion in the Province of Alberta by Alberta Agriculture. During the period December 1986 to June 1987, significant wind erosion was estimated to have occurred on 20 to 25 days. The most recent strong winds (100 km/h) occurred on May 30 to June 2, 1987. This was a critical time for wind erosion, since the crops were seeded but were only at the emergence stage.

It should be recognized that wind erosion estimates are extremely difficult to quantify and erosion itself is very non-uniform, particularly under extreme conditions. An estimated 900,000 hectares (2,000,000 acres) of land experienced significant loss of topsoil at the rate of 11 to 45 tonnes per hectare (5 to 20 tons per acre). Serious erosion losses of greater than 45 tonnes per hectare (20 tons per acre) were estimated to occur on 90,000 hectares (200,000 acres) of land. Extreme damage in excess of 225 tonnes per hectare (100 tons per acre) is estimated to have occurred on 22,000 hectares (50,000 acres) of agricultural land in Alberta.

An estimated 22,000 to 45,000 hectares (50,000 to 100,000 acres) of spring-seeded crop were blown-out and required reseeding. This was reseeding that was unlikely to have occurred because of dry soil conditions, late planting and the patchy nature of the damage.

Three very significant concerns were raised in regard to the present wind erosion potential.

- Fall-seeded crops that are used for feed may be unprotected by fall if these fields are grazed.

- Marginal soils previously damaged by erosion may not be farmed this year. These will be at high risk of more erosion damage, and creating downwind damage.

- Any factors that reduce the yield of spring crops (as current drought is doing) will result in increased wind erosion during fall to spring period, 1989-90. This is especially the case

where the crop-fallow rotation is dominant (Brown, Dark Brown, Thin Black soil zones).

Saskatchewan

There is little detail available on the impact of wind erosion in Saskatchewan this summer. Due to the dry soil moisture levels the areas identified in the crop residue survey may be expected to have suffered significant soil losses during periods of high wind. There were numerous reports of soil erosion during the May 30 to June 2 episode that caused extreme damage in southwest and west central parts of Saskatchewan. Some spot reseeding was carried out.

Manitoba

There has been little detail gathered on the extent of erosion in Manitoba this year. Manitoba Agriculture reported major damage to cereal crops in the Teulon area of the Interlake Region and to 300 acres of lentils in the Morris District of the Central Region in mid-May. Some damage to special crops was also reported in the Eastern Region due to wind erosion in May.

ON-FARM WATER SUPPLIES

Alberta

Generally, the surface water supplies in the Lethbridge District are being depleted. Poor spring runoff left much of the district with less than full supply levels. Many areas are pumping water to fill surface storage projects where there are supplies to pump from. Most areas do have enough water stored for summer use; however, continued dry weather could create a very high demand for pumping.

On-farm water supplies in the Medicine Hat District are generally adequate. Persistantly high temperatures and below normal spotty shower activity has resulted in high evaporation losses and heavy demands on stored water. Water supplies are particularly low closer to the Red Deer River where pumping is required.

The Hanna District in east central Alberta reported anywhere from zero precipitation in the Brooks and Saskatchewan border region to 150 mm in the Hanna and Blood Indian Dam area (south of Youngstown) during the July 3-6 period. Previous to this rain water supplies in on-farm surface projects were rated good. Some projects in the Coronation, Hughenden and Big Valley areas were filled by runoff due to the rainfall.

In the Red Deer District on-farm water supplies are rated good and no shortages are anticipated.

Presently, the water supply outlook is good across the northern and Peace River districts. Dugouts are generally three-quarters full to full. Pumping has been required to fill dugouts in the High Prairie area.

Saskatchewan

In the Maple Creek District water levels in dugouts and stockwatering dams are adequate. In the northern part of the district dugout levels are only one-third of full supply level due to poor runoff and lack of rain; however, this is not considered a serious problem at present.

There is adequate supply of on-farm water in the Shaunavon District. Most dugouts and stockwatering dams are one-half to three-quarters full.

Dugouts in the Gravelbourg District are generally rated as half full. Throughout the district, however, a number of farmers are reported to be hauling water. With continued dry conditions water supply shortages may be expected to become more widespread. There have been several reports of shallow wells going dry in the Limerick/Flintoft and Bateman/Shamrock areas.

Water levels in dugouts and stockwatering dams in the Swift Current District are rated as adequate. Some shallow wells are reported to have gone dry, however, the supply is generally adequate.

On-farm water supplies in the Rosetown District vary from two-thirds full to full in the northeast corner, to empty to one-third full in the west central area north of Kindersley. Some farmers are concerned about the lack of water available for pasturing; however, with pasture conditions as they are at present grass will be in short supply before water. Most domestic supplies are adequate.

Dugouts in the Watrous District are reported to be three-quarters full to full and there are no reports of on-farm water supply shortages. Irrigation supplies are limited to major water supply systems.

The water levels in most dams and dugouts in the Melville District vary from three-quarters full to full. Water supplies are generally rated good to adequate and pumping activity is normal for this time of year. In the Melville District south and west of Melville, sloughs and small lakes are dry. This would be considered well below normal. There have been shortages of irrigation water on the backflood and sprinkler projects, where insufficient spring runoff occurred. Projects along the Qu'Appelle and Assiniboine rivers and other large sources have not been affected.

Water supplies are reported to be adequate in the Melfort District. There is active pumping in the Tisdale area eastward to R.M. #394 and this should overcome any water shortages.

On-farm water supplies in the Moose Jaw District generally range from three-quarters full in the north to one-half full in the south. Water supplies are generally rated adequate.

Surface water supplies are generally rated adequate throughout the Weyburn District. Water levels have dropped significantly (as in much of the province) due to high temperatures and low rainfall during May and June. Dugout pumping may be required to secure winter supplies if dry conditions persist.

Manitoba

Dugouts throughout the Province of Manitoba are generally three-quarters full. No shortages of on-farm water supplies are anticipated due to drought conditions.

On-Farm Water Supplies

Note: This map provides a general indication of supplies and may not apply to specific locations.

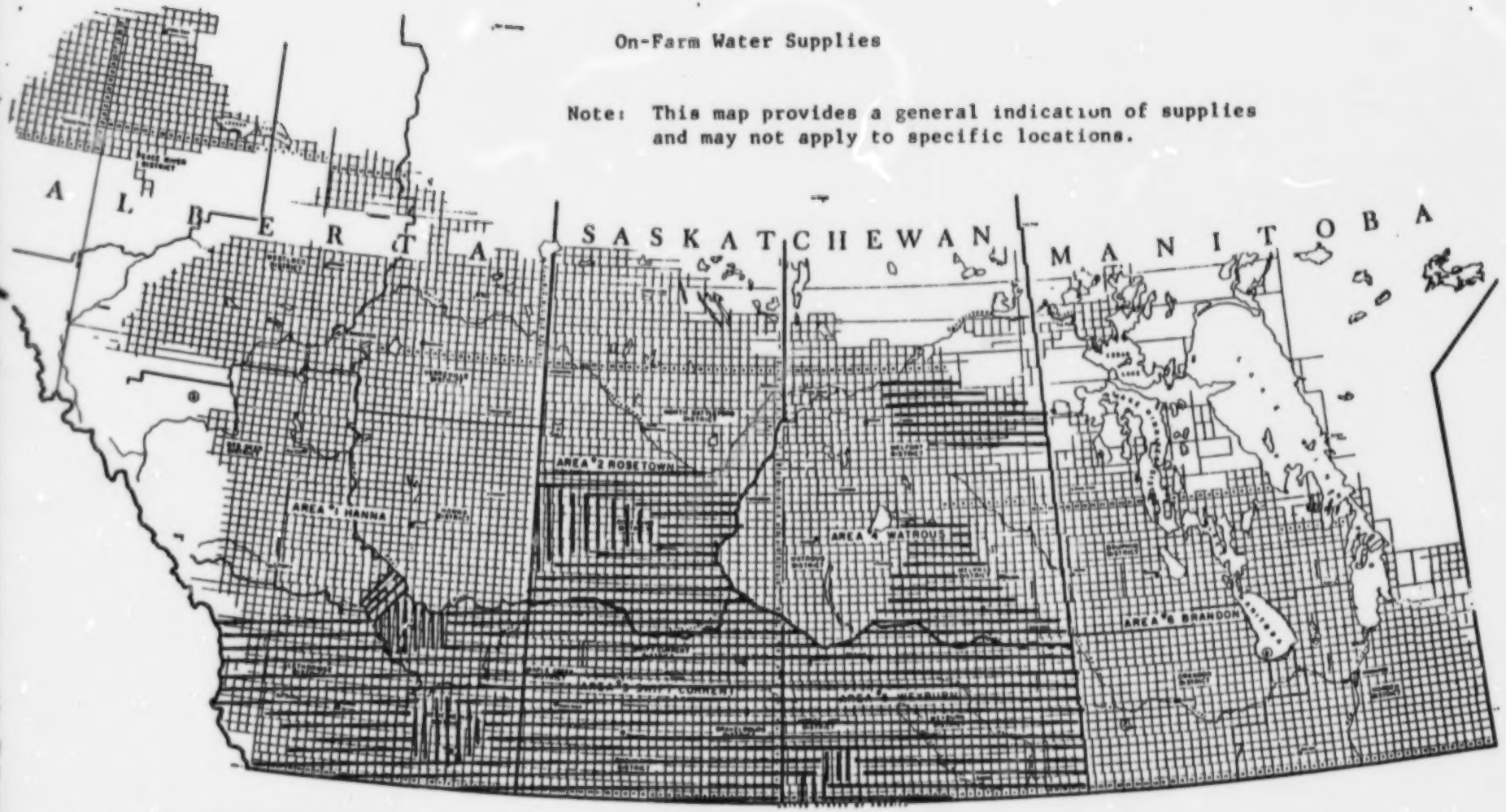


FIGURE 8

URBAN WATER SUPPLIES (Population Greater than 2000)

Alberta

At present, major storage facilities are at normal levels and no water supply shortages are expected for centres over 2000 in population.

Saskatchewan

Most centres over 2000 in population are not experiencing any shortages of water at this time and none are anticipated. The Town of Kindersley has imposed lawn water rationing to reduce the heavy demand caused by the drought conditions in the area.

Manitoba

The urban centres with population over 2000 are not experiencing any water supply problems and none are foreseen.

COMMUNITY WATER SUPPLIES (Population less than 2000)

Alberta

Water rationing is being imposed at Didsbury, Olds and Innisfail just north of Calgary. Dry weather in the Mountain View area resulted in increased water consumption, which exceeded the capacity of the treatment plant for the Regional Water System. In the Medicine Hat District declining water levels in the shallow wells have resulted in water conservation measures in the Hamlets of Hilda and Schuler.

There are no reports of water supply problems related to drought throughout the remainder of the Province of Alberta.

Saskatchewan

The Village of Limerick has pumped one of their community dugouts full from a reservoir 11 km away. Limerick will have sufficient water to last until next spring.

The Hamlet of Mazenod has implemented a rationing program as a precautionary measure to avoid a water shortage this winter.

Water shortages are being experienced in the Village of Quill Lake. It is not known, at this time, whether the problem is a declining aquifer or the well.

While the demands have been met by the Markinch water supply the supply rate of the well has slowed noticeably.

There are no further reports of drought related water supply problems for small communities in Saskatchewan.

Manitoba

Communities under 2000 population in the Province of Manitoba are not reporting any drought related water supply problems.

AGRICULTURE

Crop conditions are highly variable due to the spotty nature of localized convective rainfall. The general trend over the past several months has been warm and dry. Crop development this year is well ahead of normal.

Below normal crop yields may be expected to occur in south and south central locations of Alberta, western and northeastern Saskatchewan, and southern Manitoba. Fall seeded crops in much of these areas are expected to have below normal yields. In the western region there have been many reports of crops turned under and cattle pasturing on winter cereals.

Recent rainfall will benefit most agricultural enterprises with the moisture depleted pastures benefitting significantly.

Although hay yields are below average across much of the Prairies there is good carry-over from 1986. Prices for hay do not show any significant increase over 1986 at this time, although a rise is anticipated.

Alberta

The potential for significant drought damage was apparent throughout southern and central regions of Alberta by mid-June. Rainfall during the first week of July will be most beneficial to the previously dry central region. Precipitation amounts were variable and some crops were too far developed to benefit from the rain; however, many will benefit from the essential rain.

Dry conditions remain in Pincher Creek and Medicine Hat. Rainfall is required in the Northwest and eastern Peace River regions.

Saskatchewan

Drought conditions continue to stress crops in the southwest, southeast and west central areas of the Province of Saskatchewan.

Saskatchewan agriculture estimates that crop development is generally 10 days ahead of normal. Drought stressed crops are reported to be worked under in the Kindersley and Rosetown; Weyburn, Estevan and Bengough areas of southern Saskatchewan; and in the Tisdale region of northeast Saskatchewan.

Manitoba

The scattered rain and cooler temperatures reported across much of the Prairies has improved crop development in Manitoba. Manitoba Agriculture reports that all cereals are headed out in the central region and most crops are heading out in other regions.

Much of southern Manitoba remains in a deficit moisture position with respect to normal, with less than 70 percent of normal rainfall to July 13, 1987. Continued rains would be very beneficial at this time, particularly in southwest Manitoba.

ACKNOWLEDGEMENTS

Information supplied by the following agencies for the preparation of this report is gratefully acknowledged.

Manitoba Natural Resources

Manitoba Agriculture

Manitoba Hydro

Saskatchewan Institute of Pedology

Saskatchewan Power Corporation

Saskatchewan Water Corporation

Saskatchewan Agriculture

Saskatchewan Wheat Pool

Alberta Environment

Alberta Agriculture

Alberta Wheat Pool

Transalta Utilities Inc.

Land Resource Research Centre, Agriculture Canada

Atmospheric Environment Service, Environment Canada

Inland Waters Directorate, Environment Canada

Statistics Canada

Prairie Farm Rehabilitation Administration, Agriculture Canada

WATER SUPPLY REPORT
QUESTIONNAIRE

The following questionnaire has been prepared to help identify your needs.

1. How would you rate the degree of detail on the following topics? Please circle one answer for each topic.

   1 - Too much detail
   5 - Not enough detail

Weather	1	2	3	4	5
Hydrology	1	2	3	4	5
Groundwater	1	2	3	4	5
Soil Moisture	1	2	3	4	5
Pasture and Hayland	1	2	3	4	5
Wind Erosion	1	2	3	4	5
On-Farm Water Supplies	1	2	3	4	5
Urban and Community Water Supplies	1	2	3	4	5
Agricultural Outlook	1	2	3	4	5
Other (please specify) _____	1	2	3	4	5

2. To the best of your knowledge, how would you rate the accuracy of the information?

   1 - Very accurate
   5 - Very inaccurate
   6 - No comment

Weather	1	2	3	4	5	6
Hydrology	1	2	3	4	5	6
Groundwater	1	2	3	4	5	6
Soil Moisture	1	2	3	4	5	6
Pasture and Hayland	1	2	3	4	5	6
Wind Erosion	1	2	3	4	5	6
On-Farm Water Supplies	1	2	3	4	5	6
Urban and Community Water Supplies	1	2	3	4	5	6
Agricultural Outlook	1	2	3	4	5	6
Other (please specify) _____	1	2	3	4	5	6

Comments:

The business reply is addressed on the reverse side of this page. There is no postage necessary.

Please fold along the lines on the reverse side ensuring that the postal mark and address are shown. Tape the page closed and drop it in the mail. Thank you.